PROC. BIOL. SOC. WASH.
104(4), 1991, pp. 742–750

V. L. WAGIN'S COLLECTIONS OF DENDROGASTRIDAE (CRUSTACEA: ASCOTHORACIDA) IN THE U.S.S.R., WITH DESIGNATIONS OF LECTOTYPES

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Abstract.—An inventory is given of the echinoderm-parasitizing dendrogastrid Ascothoracida studied by V. L. Wagin that are housed in the Zoological Institute, U.S.S.R. Academy of Sciences, and the Department of Invertebrate Zoology, Leningrad University. Complete locality data for most of these Arctic and boreal Pacific species are given for the first time. Lectotypes are designated for one species of *Ulophysema* and eight species of *Dendrogaster,* and the asteroid hosts of *D. astericola, D. dogieli,* and *D. beringensis* are reidentified as *Henricia skorikovi, Pteraster octaster,* and *Eremicaster crassus,* respectively.

Резюме.—Описана коллекция дендрогастрид (Ascothoracida) - паразитов иглокожих, изученная В. Л. Вагиным, которая хранится в Зоологическом институте Академии наук СССР и на кафедре Зоологии беспозвоночных Ленинградского государственного университета. Приводится впервые полный список местонахождений для большинства из этих арктических и бореальных тихоокеанских видов. Выделены лектотипы для одново из видов *Ulophysema* и восьми видов *Dendrogaster.* Морские звезды-хозяева *D. astericola, D. dogieli* и *D. beringensis* переопределены как *Henricia skorikovi, Pteraster octaster* и *Eremicaster crassus,* соотвественно.

The Dendrogastridae include three genera of crustacean endoparasites of echinoderms (Grygier 1987). Wagin (1950b, 1957, 1976) conducted taxonomic studies of 13 species of *Dendrogaster* infesting Asteroidea, mostly from the vicinity of Sakhalin and the western Bering Sea, and he published one record (Wagin 1964) of echinoid-infesting, Arctic *Ulophysema.* The Pacific specimens were collected by A. V. Ivanov in 1931 and 1932 and by Wagin himself in 1947 and 1950. Wagin's publications were usually unspecific about collection data and deposition of specimens, often mentioning only the year, station number, and host, and he never designated any primary types. Two partial compilations of Wagin's findings (Lindberg 1959, Barel & Kramers 1977) did little to clarify matters. The following is an inventory of the extant material of each species in Leningrad and its condition, with full locality data and lectotype designations in most cases.

Materials.—In 1985 I examined the type lot of *Ulophysema pourtalesiae* Brattström in the Zoologisk Museum in Copenhagen and borrowed specimens of *Dendrogaster astericola* Knipowitsch and *D. murmanensis* Wagin from the Zoological Institute (ZIN) in Leningrad. During a visit to the ZIN in 1989 I was able to examine abundant catalogued material of *Dendrogaster,* as well as uncatalogued specimens that had been transferred from Kazan University after Wagin's death in 1984. All of the pertinent species of *Dendrogaster* were represented and I could match many specimens with Wagin's illustrations; the glass-plate negatives of Wagin's (1950b) photographs were also present. However, some specimens and almost all of Wagin's microscopical preparations were missing. At Leningrad Uni-

versity (LGU), where Wagin did his graduate work, there were some specimens in the teaching collection of the Department of Invertebrate Zoology and a few slides in the parasitological collection. Efforts to determine whether there are any specimens in the Zoological Museum of Moscow University have been fruitless. A. V. Smirnov of the ZIN, after searching station lists (e.g., Ivanov 1933) and consulting with A. V. Ivanov and G. M. Belyaev, was able to provide me with almost all the detailed collection data pertaining to the Pacific *Dendrogaster* and Arctic *Ulophysema* samples (Appendix).

Several of Wagin's specific names appeared first as nomina nuda (e.g., Korschelt 1933; Vaghin (=Wagin) 1946; Wagin 1948a, 1948b), sometimes under varying spellings, and some of the spellings employed here are corrected to conform to the International Code of Zoological Nomenclature. It is possible that some of the new specific names accompanied by extremely brief characterizations in Wagin's (1950a) dissertation summary, which preceded the full descriptions (Wagin 1950b) by several months, meet the criteria of publication and availability, though I provisionally consider them nomina nuda; the spellings of two specific names were different in the earlier work (see below). Since Wagin did not designate primary types, I am treating as syntypes all female and male specimens in the samples that were mentioned in his original descriptions.

Genus *Ulophysema* Brattström, 1936

Ulophysema pourtalesiae Brattström, 1937

This endoparasite of the irregular echinoid *Pourtalesia jeffreysi* Wyville Thomson was originally described from bathyal depths between Greenland and the Norwegian Slope. Wagin (1964, 1976) reported it from the northern Kara Sea, implying but not specifying that it had the same host. I did not find Wagin's material in Leningrad in 1989, but I am taking this opportunity to name one of Brattström's syntypes in the Zoologisk Museum in Copenhagen as the lectotype. This is the female from host #7 in the type lot. Its isolated body has been illustrated (Brattström 1937:fig. 3), and its carapace (mantle) is torn into two pieces. It was collected at the type locality designated by Brattström: Danish Three-Year Expedition to East Greenland, sta. 96, 13 Aug 1932, off Cape Franklin in the Franz Josef Fjord, East Greenland 73°15'N, 22°30'W, 325 m, 1.5°C.

Genus *Dendrogaster* Knipowitsch, 1890

Dendrogaster astericola Knipowitsch, 1890

This is the type species of the genus. The original description was based on two females from the Solovetskiy Islands in the White Sea, a brooding one infesting *Henricia sanguinolenta* (O. F. Müller) and a nonbrooding one infesting *Solaster endeca* (L.); the host names are as given by Knipowitsch (1892). The first specimen, collected by Knipowitsch himself, is housed in the ZIN (1/19631, 2/19632), but only a lobe of the mantle, some brooded ascothoracid-larvae, and the host asteroid are preserved. This is an illustrated specimen (Knipowitsch 1891: fig. 2, 1892:taf. I, figs. 1, 2) and I am choosing it as the lectotype. The second specimen has been reidentified as *D. murmanensis* by Wagin (1950b; see below). I did not find Knipowitsch's (1892) histological sections of either specimen in the ZIN in 1989, though Wagin (1976) claimed they were there. The lectotype's host actually keys out as *Henricia skorikovi* Djakonov, a supposed White Sea endemic (key of D'yakonov 1968). Madsen (1987) did not include *H. skorikovi* in his revision of *Henricia* of the Norwegian Sea, but noted that it is evidently related to *H. eschrichti* (Müller & Troschel).

Dendrogaster murmanensis Wagin, 1950b

Kluge (1911, 1912) found *Dendrogaster* infesting *Crossaster papposus* (L.) and *Solaster endeca* in the Kola Fjord near the

Murmansk Biological Station. Wagin often gave Kluge (1912) credit for proposing the name *D. murmanensis* for these parasites, as a nomen nudum, but I have found no specific name used in Kluge's reports. While several papers had discussed *D. murmanensis* n. nud. more or less extensively (reviewed by Wagin 1950b), the first one that appears to have met all the requirements for availability was Wagin (1950b) itself.

One of the illustrated specimens included in *D. astericola* by Knipowitsch (1891:fig. 1, 1892:taf. I, fig. 5) actually belongs to *D. murmanensis,* according to Wagin (1950b). I did not find this specimen in Leningrad in 1989. Wagin had access to Kluge's specimens, at least some of which fill a large number of uncatalogued bottles and tubes in the ZIN (Acc. no. 144-1957 in part, remainder unaccessioned; reidentified by me in 1989); in most bottles the cryptic and incomplete labels are dated either between 1911 and 1913 or as 1927 and they occasionally refer to Kluge or the Murmansk Biological Station or one of the host species.

Two lots, one labeled "N6, N7, N3" and consisting of three females taken from *Crossaster* on 3 Jan 1911, the other labeled "N5" and containing one female collected on 7 Jan 1911, claim to correspond to drawings, but it is unclear which drawings are meant. With regard to "N3," for example, specimen #3 of Wagin (1950b) was collected by him in 1947 (see below), not by Kluge in 1911.

Wagin (1976) wrote that the type specimens are in the ZIN and that paratypes are in the Museums of Leningrad and Kazan Universities; however, there were no specimens in 1989 in the LGU collections. The handwritten label of one accessioned tube in the ZIN reads, "Murmanskaya biologich. Stantsiya. Barentsogo Morye Sb. 2. Al. Kluge. 6-1-1927," with the typewritten notation "Tip" [type]; it contains nine females in good condition, some broken female branches, a vial of eggs, and a vial of three torn pieces possibly of a male but without the main body. Unfortunately I had no time to study this lot in detail, but its specimens cannot fairly be regarded as the only syntypes, not having been so designated by Wagin in 1950.

Wagin (1950b) reported nine females of *D. murmanensis* from *Crossaster papposus* collected off SW Sakhalin in 1947 (ZIN 1/23368). Three specimens are more or less whole and the others are torn and fragmented. None could be matched to illustrations, so none is considered suitable to be named as lectotype.

Dendrogaster rimskykorsakowi Wagin, 1950b

This species is based on four females, one from sta. 57 in the northern Sea of Japan, parasitizing *Ctenodiscus crispatus* Retzius, and three from stas. 57 and 95 in the Sea of Okhotsk off Sakhalin, parasitizing *Hippasteria leiopelta* Fisher. A. V. Ivanov collected additional specimens from *C. crispatus* in the northern Sea of Japan and Tatar Strait, but Wagin saw only some of their larvae.

Wagin (1976:93) invalidly tried to restrict the type lot, "Type specimens in ZIN AN SSSR, out of *Ctenodiscus crispatus.*" [my translation]. The female from this host (ZIN 1/23377), now in five pieces and with the middle piece opened and males removed, was illustrated (Wagin 1950b:fig. 5a; tab. I, fig. 7), and I am naming it the lectotype. Specimens from sta. 57 or 95 (ZIN 2/23378) are paralectotypes and consist of a whole female with an opened middle piece and two isolated males. Although there is only one female, two labels in the jar read "57" and "95–96," hence the ambiguity. The latter designation may mean along the cruise track between stas. 95 and 96 (see Appendix). A vial of metanauplii of this species found packaged together with the types of *D. dogieli* (see below) was also labeled "95–96." Another paralectotype female remains in situ in its host *Hippasteria leiopelta* in

the teaching collection at LGU (shelf A-5); Wagin (1950b:tab. I, fig. 11) published a photograph of this specimen.

Dendrogaster dichotoma Wagin, 1950b

This species was based on three females from sta. 78 in the Tatar Strait and apparently from sta. 81 off eastern Sakhalin. The host was *Crossaster papposus* in the second case and probably also in the first (at least the same genus). The labels in the two bottles of *D. dichotoma* at the ZIN have become confused; ZIN 1/23366 contains the original labels for both stas. 78 and 81 as well as a copied label for sta. 81, and ZIN 2/23367 has no original label, only a copied one for sta. 78. I think the copied labels are in the wrong jars. According to Wagin (1950b), his figs. 10 and 11b ought to be based on the two females from sta. 81, but at the ZIN the smaller female is missing, and the specimen upon which his fig. 10 and tab. I, fig. 8 are based (ZIN 2/23367) is in the bottle labeled sta. 78. I am naming the latter specimen the lectotype; it is broken into three big pieces and about 10 small ones, and the tip of its middle piece is gone. The other bottle (ZIN 1/23366) contains a whole paralectotype female and a vial of three paralectotype males (another male may be present in the female's middle piece). Wagin (1950b) only mentioned finding males in the female from the Sea of Japan, i.e., from sta. 78.

Besides these specimens, the parasitology collection at LGU holds two slides (N3316, N3322) of paralectotype males of *D. dichotoma,* neither of them being the models for any illustrations. N3316 displays a male in situ within a mantle branch tip of a brooding female.

Dendrogaster arctica Korschelt, 1933

Grygier (1986) named a lectotype and explained why Korschelt (1933) is the valid author of this specific name, based on Fisher's (1930) material from *Albatross* sta. 3252 in the Bering Sea (host: *Leptasterias groenlandica* (Lütken)). Wagin's (1950b) three females collected from *L. groenlandica* in the Anadyr Gulf are therefore not types despite his later claim to authorship (Wagin 1976). The two adult females illustrated by Wagin (1950b:fig. 15a; tab. I, figs. 9, 10), both broken into several pieces, and four males accompanying the female in his fig. 15a, two of them whole and two dissected, are housed at the ZIN (1/23375). The third, juvenile female is missing.

Dendrogaster dogieli Wagin, 1950b

Two females were found in a single specimen of supposed *Pteraster obscurus* Perrier off SE Sakhalin. The multi-rayed host is actually *P. octaster* Verrill (A. V. Smirnov, in litt.; for taxonomy see Smirnov 1982). The extant type material of *D. dogieli* (ZIN 1/23372) consists of both females photographed by Wagin (1950b:tab. II, figs. 9, 10), one lacking the middle piece, the other with its appendages dissected out; neither is in good enough condition to confirm the large, bifid "extra branch" opposite the middle piece. The smaller of the two is illustrated by a drawing (Wagin 1950b:fig. 17a) and it is chosen as the lectotype; the other female is a paralectotype. A paralectotype male, the one illustrated by Wagin (1950b:fig. 18a), is mounted on a slide (N3320) in the parasitology collection at LGU.

Dendrogaster leptasteriae Wagin, 1950b

This species was described on the basis of specimens or fragments infesting *Leptasterias fisheri* Djakonov at stas. 79 and 81 in the Tatar Strait in 1931 and stas. 67 and 83 in the Sea of Okhotsk near Sakhalin in 1947. There are two lots of syntypes of this species at the ZIN. ZIN 1/23370 is from either or both of the 1931 stations (the label bears the following numbers of unknown significance: 3, 25, 41, 56) and consists of over 20 broken fragments from more than

one female, with no middle pieces among them, and also two vials of eggs and a vial containing two males. Males were only reported from sta. 81. ZIN 2/23374 from sta. 83 consists of three females (two of them with dissected middle pieces), a broken-off mantle branch, and a vial of ascothoracid-larvae. None of the females is the one illustrated by Wagin (1950b:fig. 19a; tab. III, fig. 7). It is unclear whether any are the ones he photographed (Wagin 1950b:tab. II; fig. 3, tab. III, fig. 8). Another female syntype from the Sea of Okhotsk (sta. 67 by elimination; probably Wagin's specimen no. 4) remains in situ within its host in the teaching collection at LGU (shelf A-6); this one was photographed (Wagin 1950b:tab. I, fig. 12) and it is named the lectotype.

Dendrogaster iwanowi Wagin, 1950b

This species was spelled *D. ivanovi* in Wagin (1950a), and it could be argued that this spelling has priority. Three females were found within *Leptasterias fisheri* (questionable field identification) in the Tatar Strait. A damaged one was used by Wagin for histological study. The other two comprise ZIN 1/23373. One is the specimen illustrated by Wagin (1950b:fig. 23a; tab. II, fig. 6), and it is named the lectotype. The other, which has had its middle piece dissected, may have been the model for fig. 24 in that paper, and it is named the paralectotype. I did not find the males described by Wagin.

Dendrogaster astropectinis (Yosii, 1931)

This species was originally described as *Myriocladus astropectinis* from *Astropecten scoparius* Valenciennes in shallow water in Japan. The type locality was unspecified but assumed by Wagin (1950b) to have been Misaki. I have been unable to locate any extant types.

Wagin (1950b) assigned to this species 17 whole and and broken females, together with a number of males, found in 13 *Psilaster pectinatus* Fisher at sta. 4 off the Kamchatka Peninsula. The available material from this station (ZIN 1/23383) consists of five more or less complete females and a great number of large and small fragments without middle pieces, as well a vial with two males labeled "26 & 27." One of the semi-intact females probably corresponds to Wagin's (1950b) fig. 27b; I cannot say for sure whether any correspond to that paper's photographs (tab. I, figs. 1–6).

Wagin also deposited two bottles of this species from the Bering Sea in the teaching collection at LGU (shelves A-4 and A-7), and the latter one contains a specimen in situ in its unidentified host. Sta. 4 is technically not in the Bering Sea (see Appendix), but I think it is safe to assume that these two bottles are from the same lot as those in the ZIN.

Wagin (1957) reported additional material from *Psilaster pectinatus* collected by the *Vityaz* in 1950. A bottle (ZIN 2/23384) containing eight females, seven of them whole, and a vial of three males correspond to at least some of this lot.

Dendrogaster elegans Wagin, 1950b

This name was spelled *elegaus* in Wagin (1950a), and it might be argued that this spelling, perhaps corrected for gender to *elegaa,* has priority; there is no internal evidence in that dissertation summary that *elegaus* was a typographical mistake for *elegans.* The type specimens were found in *Leptasterias* (*Hexasterias*) *polaris* (Müller & Troschel) at four sites in the Bering Sea as well as off the east coast of Sakhalin; no lectotype is named here. Some of the syntypes housed at the ZIN are poorly labeled. One specimen from sta. 82 (ZIN 1/23379) is an immature female broken into two pieces. A bottle labeled as being from Bukhta Natal'ya (ZIN 3/23381) has five isolated mantle pieces and many broken fragments (there should be three specimens from this site—Wagin 1950b) with the following additional indi-

cations on the labels: "48" and "48a," which are interpreted, perhaps wrongly, as station numbers in the Appendix, and "170 m." A third bottle (ZIN 2/23380), with no clear locality data, contains two broken-up females, one of which in my opinion may be mistakenly included in *D. elegans* since it appears very distinctive and has a short middle piece. This bottle also contained labels marked: "1932," "93," "129" (or "124"?), "51 1932," and "52 1932." The numbers other than the years do not correspond to station numbers (A. V. Smirnov, pers. comm.).

Wagin (1957) reported additional specimens of *D. elegans* from *Hexasterias polaris* (=*Leptasterias polaris*) collected in the Anadyr Gulf in the Bering Sea. He wrote that he had deposited two specimens in the ZIN, where I found an undetermined number of individuals lacking middle pieces (ZIN 4/23382); supposedly two more specimens were deposited in the Moscow University Museum, but I could not confirm this.

In the teaching collection at LGU, a bottle on shelf B-3 contains an unidentified *Dendrogaster* together with many specimens of the parasitic eulimid gastropod *Asterophilus* sp., infesting a specimen of *Leptasterias polaris* from the Bering Sea, identified by A. V. Ivanov in 1932. The ascothoracidan appears to be *D. elegans* but could be *D. orientalis* (see below).

Dendrogaster orientalis Wagin, 1950b

The description mentioned material from the Bering Sea in 1932 from a host questionably identified as *Leptasterias polaris* and from stas. 67 and 69 off SE Sakhalin in 1947 from *Leptasterias orientalis* Djakonov. An apparently mixed lot at the ZIN (1/23376) seems to include the specimens collected in 1947: a young, complete female, an incomplete female with a dissected middle piece, and three isolated primary branches perhaps belonging to a third female. There is also a vial of larval exuviae and ascothoracid-larvae. The young specimen is from sta. 67 according to the original label, but the others are most likely from sta. 69, judging from the information given by Wagin (1950b:tab. 12). Although there are drawings and photographs of three of the four original specimens in Wagin's description, I could match none of the present specimens to them, so no lectotype is named.

Dendrogaster ramosa Wagin, 1950b

This species is based on two females infesting supposed *Leptasterias fisheri* (field identification) in the Tatar Strait. The large specimen (ZIN 1/23369) and the small one (ZIN 2/23371) both have dissected middle pieces and the former is lacking its reported males. Both specimens were illustrated; the large one (Wagin 1950b:fig. 37; tab. II, fig. 8) is named the lectotype and the small one (Wagin 1950b:fig. 38a; tab. II, fig. 7) is a paralectotype.

Dendrogaster beringensis Wagin, 1957

Seven specimens of this species infesting *Eremicaster tenebriarius* Fisher (i.e., *E. crassus* (Sladen); for taxonomy see Belyaev (1985)) were collected by the *Vityaz* in 1950, apparently at sta. 618 in the Bering Sea. Wagin (1976) reported that he had deposited "all the type specimens" in the ZIN, and kept one together with its host sea-star in the Zoological Museum of Kazan University. Six females are indeed catalogued at the ZIN (1/23385) as *Dendrogaster beringii* (sic), including five in alcohol and a small one mounted whole on a slide. In addition, several uncatalogued slides have recently been transferred from Kazan: 1) female cephalic appendages; 2) a male with one carapace valve separated (illustrated by Wagin 1957:fig. 3b); 3) an antennule from the same male; 4 and 5) nauplii in poor condition. The female which looks most similar to and which may have been the model for Wagin's (1957) fig. 1a is chosen as the lec-

totype; the other female and male specimens are paralectotypes.

Wagin (1976) reported another specimen collected from the same host in 1968 in the Kuril-Kamchatka Trench by the *Vityaz*. However, Wagin must have been mistaken because the *Vityaz* operated in that region in 1966, not 1968 (G. M. Belyaev, pers. comm. via A. V. Smirnov, in litt.). The specimen was not in the ZIN in 1989, and I don't know whether it is in Moscow.

Acknowledgments

I thank T. Wolff (Zoologisk Museum, Copenhagen) for allowing me to examine type specimens there during a visit funded by the American-Scandinavian Foundation and for interceding on my behalf for the initial loan of specimens from the ZIN, and M. Downey (formerly Smithsonian Institution) for helping me to reidentify the host of *Dendrogaster astericola*. My visit to Leningrad was arranged by the National Academy of Sciences Soviet and East European Exchange Program. I thank Ya. I. Starobogatov, I. S. Smirnov, and N. V. Vyshkvartseva (ZIN) and T. A. Ginetsinskaya (LGU) for allowing me to examine Wagin's specimens, and E. L. Markhaseva and especially A. V. Smirnov (ZIN) for providing much background information about them; Dr. Markhaseva provided the Russian abstract. The manuscript was partly prepared while I was a Visiting Foreign Researcher at the Sesoko Marine Science Center, Okinawa, Japan.

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Appendix

Full locality data for Dendrogastridae (*Ulophysema* and *Dendrogaster*) found in Soviet waters by A. V. Ivanov and V. L. Wagin and studied by Wagin (1950b, 1957, 1964, 1976). Asterisks (*) indicate localities for which Wagin provided no station number. In these cases station numbers have been tentatively inferred on the basis of other information, such as reported depth or geographical location or indications on specimen labels, and conflicting information is mentioned.

U. pourtalesiae

Wagin & Koltun, C-3 Expedition, sta. 85, 12 Aug 1948, Svyataya Anna Trough, Kara Sea, 78°31′N, 66°44′E, 387 m.

D. murmanensis

Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 15, 7 Aug 1947, Sea of Japan off SW Sakhalin, 47°10.0′N, 141°48.0′E, 165 m, 2.7°C.

D. rimskykorsakowi

Ivanov, Pacific Research Institute of Marine Fisheries and Oceanography (TINRO), *Rossinante,* sta. 57, 31 Jul 1931, N Sea of Japan, 46°15.0–14.8′N, 138°34.2–33.2′E, 627–636 m, 0.11°C.

Ibid., sta. 62, 2 Aug 1931, N Sea of Japan, 47°39.0′N, 139°55.7–59.0′E, 340–410 m, 0.36°C.

Ibid., sta. 74, 6 Aug 1931, N Sea of Japan, 48°14.4′N, 140°51.7′E, 576–592 m, 0.12°C.

Ibid., sta. 82, 10 Aug 1931, Tatar Strait, 50°54.3′N, 141°27.5–25.9′E, 75 m.

Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 57, 12 Sep 1947, Sea of Okhotsk off SE Sakhalin, 46°59.7′N, 143°11.5′E, 52 m, −1.5°C.

Ibid., sta. 95–96, 12 Sep 1947, Sea of Okhotsk off E Sakhalin, 48°47.8–50.5′N, 143°04.1–04.5′E, 33–27 m, 1.6–3.0°C.

D. dichotoma

Ivanov, TINRO, *Rossinante,* sta. 78, 8 Aug 1931, Tatar Strait, 49°14.9–12.7′N, 141°39.8′E, 165–185 m, 1.27°C.

*Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 81, 9 Sep 1947, Sea of Okhotsk off Terpeniya Peninsula, E Sakhalin, 49°01.1′N, 144°37.8′E, 47 m, 2.8°C.

D. arctica

Ivanov, Kamchatka-Bering Strait Expedition, sta. 46, 29 Aug 1932, Anadyr Gulf, Bering Sea, 64°22′N, 179°46′E, 46 m.

D. dogieli

Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 64, 4 Sep 1947, Sea of Okhotsk off SE Sakhalin, 46°48.0′N, 143°48.0′E, 143 m, −0.9°C.

D. leptasteriae

Ivanov, TINRO, *Rossinante,* sta. 79, 9 Aug 1931, Tatar Strait, 50°57.8–56.6′N, 142°02.7–02.4′E, 47 m, 7.26°C.

Ibid., sta. 81, 10 Aug 1931, Tatar Strait, 50°55.4–54.9′N, 141°45.5–42.5′E, 71–73 m, 0.72°C.

Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 67, 5 Sep 1947, Sea of Okhotsk off SE Sakhalin, 47°33.0′N, 143°54.2′E, 144 m, −1.0°C.

Ibid., sta. 83, 9 Sep 1947, Sea of Okhotsk off Terpeniya Peninsula, E Sakhalin, 49°01.0′N, 144°48.5′E, 127 m, −0.7°C.

D. iwanowi

Ivanov, TINRO, *Rossinante,* sta. 85, 10 Aug 1931, Tatar Strait, 50°58.4′–51°00.0′N, 140°44.8–46.0′E, 58–60 m, −0.7°C.

D. astropectinis

Ivanov, Kamchatka-Bering Strait Expedition, sta. 4, 17 Jul 1932, Pacific Ocean off Petropavlovsk, Kamchatka Peninsula, 52°34.7′N, 159°39.1′E, 1500–2000 m.

*Wagin, *Vityaz,* sta. 591, 13 Sep 1950, Bering Sea, 60°52.5′N, 175°22′E, 2160 m or 2200 m (but 2300 m.—Wagin 1957).

D. elegans

Ivanov, Kamchatka-Bering Strait Expedition, sta. 12, 28 Jul 1932, Bering Sea off Mys Navarin, 62°13.0′N, 179°15.0′E, 50 m (but off Mys Povorotnii.—Wagin 1976).

*Ibid., sta. 48, 7 Sep 1932, Bukhta Natal'ya, Bering Sea, 63°34.4′N, 179°49′W, 49 m (but 170 m according to one label; 25 Aug 1932.—Wagin 1950b).

Ibid., sta. 20, 7 Aug 1932, Bering Strait S of Krusenstern Is. (i.e., Little Diomede Is.), 32–40 m.

Ibid., no station mentioned or inferred, 1932, Bering Strait.

Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 82, 9 Sep 1947, Sea of Okhotsk off Terpeniya Peninsula, E Sakhalin, 49°01.0′N, 144°41.5′E, 75 m, 0.8°C.

*Wagin, *Vityaz,* sta. 582, 11 Sep 1950, Bering Sea off Mys Navarin, 62°10.9′N, 179°00.8′E, 42–53 m (but 30–70 m.—Wagin 1957).

D. orientalis

Ivanov, Kamchatka-Bering Strait Expedition, no station mentioned or inferred, 1932, Bukhta Natal'ya, Bering Sea.

Wagin, ZIN Kuril-Sakhalin Expedition, *Toporok,* sta. 67, 5 Sep 1947, Sea of Okhotsk off SE Sakhalin, 47°33.0′N, 143°54.2′E, 144 m, −1.0°C.

Ibid., sta. 69, 5 Sep 1947, Sea of Okhotsk off SE Sakhalin, 47°32.0′N, 143°38.2′E, 128 m, −1.1°C.

D. ramosa

Ivanov, TINRO, *Rossinante,* probably between stas. 81 and 85, 10 Aug 1931, Tatar Strait (sta. 81: 50°55.4–54.9′N, 141°45.4–42.5′E, 71–73 m, 0.72°C; sta 85: 50°58.4′–51°00.0′N, 140°44.8–46.0′E, 58–60 m, −0.7°C).

D. beringensis

Wagin, *Vityaz,* sta. 618, 25 Sep 1950, SW Bering Sea, 57°18.5′N, 168°50′E, 3940 m.

*G. M. Belyaev, *Vityaz,* sta. 5637 or possibly 5603, Kuril-Kamchatka Trench (sta. 5637: 9 Sep 1966, 44°29′N, 149°06′E, 3015–2665 m; sta. 5603: 15 Jul 1966, 46°22′N, 153°03′E, 3175–3250 m) (but 2590 m in 1968.—Wagin 1976; *Vityaz* operated in this area in 1966, not 1968.—Belyaev, pers. comm. via A. V. Smirnov, in litt.).